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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

IP, SIKYIN

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 09/720,730	Applicant(s) WATANABE ET AL.	
	Examiner Sikyln Ip	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10/14/08;10/21/08.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3,7-10,15-17 and 20-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3,7-10,15-17 and 20-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating

obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 3, 7-10, 15-17, and 20-29 are rejected under 35 U.S.C. § 103 as being unpatentable over USP 5693203 to Ohhashi et al (col. 6, lines 32-63) in view of applicant's admission (Rule 132 declaration filed on April 12, 2004, items 3-4) or USP 4720300 to Nishizawa et al.

Ohhashi discloses the features including the claimed backing plate (col. 4, lines 65-67), Nb sputtering target (col. 4, lines 61-64) and grain size (col. 6, lines 1-20). Ohhashi discloses uniformity of recrystallized structure of sputtering target would be destructured by (1) Explosive bonding, hot rolling and (3) Grooved process (col. 3, lines 35-51 and col. 4, lines 9-26). These examples show that recrystallized structure of sputtering target is expected in sputtering target taught by Ohhashi. The recrystallization temperature varies with material which is contemplated within ambit of

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ordinary skill artisan to use the conventional recrystallization temperature for known material in order to obtain a recrystallized structure. Ohhashi also discloses a sputtering target structure (Figure 1). Ohhashi does not disclose the % of grain deviation and O and/or Ta content dispersion in the target. However, sputtering target taught by Ohhashi is directed to uniform microstructure which requires uniform grain size and no or little diffusion of their constituent atoms (col. 6, lines 32-62). Thus, uniform grain size meets the claimed grain size range. Ohhashi does not disclose O and Ta contents. But, claimed Ta concentration is merely conventional in crude niobium metal (Nishizawa, Tables 1, 3, or 4). Moreover, applicant's admission in Rule 132 declaration, items 3-4, acknowledges that Ta and O are inevitable impurities that exist even in high purity Nb sputtering target. In view of applicant's admission, ordinary skill artisan would recognize Nb sputtering target of Ohhashi would inherently possess Ta and O as inevitable impurities. Since Ta and O are inevitable impurities, their dispersion would be uniform in Nb sputtering target. Thus, the dispersion % of said O and Ta is zero. Moreover, difference in degree of purity itself does not predicate patentability. In re King, 43 USPQ 400 and In re Merz, 38 USPQ 143 and In re Cofer, 354 F2d 664, 148 USPQ 268 (CCPA 1966).

With respect to the limitation

~~being respectively defined by the following equation, for respective measured content values~~
“ ~~of 9 specimens sampled at respective predetermined positions in the target:~~ ” in claim 1, for example, first it is a product-by-processing step which carries insignificant patentable weight if it does not change the structure/property of the final product or claimed structure/property of the final product is disclosed by prior arts. Second, said step merely measure the dispersions of Ta and O impurities which are already in the target if

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they do exist. Third, in said step, the number of samplings at various positions in the target would not affect the dispersion % when the dispersion of Ta and O impurities are uniform in the target. The same first reason is also applied to steps of melting and plastic working.

With respect to the dispersion % expression, that it is well settled that there is no invention in the discovery of a general formula if it covers a composition described in the prior art, *In re Cooper and Foley* 1943 C.D. 357, 553 O.G. 177; 57 USPQ 117, *Taklatwalla v. Marburg*, 620 O.G. 685, 1949 C.D. 77, and *In re Pilling*, 403 O.G. 513, 44 F(2) 878, 1931 C.D. 75.

With respect to claimed Nb liner in claims 9, 17, 23-25, and 27-29 that the intended use liner has no structure and reads on Nb product of cited references.

Claims 9, 17, 23-25, and 27-29 are further rejected under 35 U.S.C. 103(a) as being unpatentable over USP 5693203 to Ohhashi et al as applied to claims above, and further in view of acknowledged prior art admission in instant specification page 2, lines 1-24.

The claimed subject matter as is disclosed and rejected above by the cited references except for uses the Nb sputtering target as liner material to Al. However, acknowledged prior art discloses the claimed use of the Nb sputtering target in the same field of endeavor or the analogous metallurgical art. Therefore, it would have been obvious to one having ordinary skill in the art of the cited references at the time the invention was made to use Nb sputtering target as taught by acknowledged prior art admission in order to reduce the interconnection resistance and improve reflow

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characteristics of Al (See instant specification page 2, lines 20-24). In re Venner, 120 USPQ 193 (CCPA 1958), In re LaVerne, et al., 108 USPQ 335, and In re Aller, et al., 105 USPQ 233.

Response to Arguments

Applicant's argument filed October 14, 2008 and October 21, 2008 have been fully considered but they are not persuasive.

Applicants argue that references of record do not disclose the recited method steps. But, instant rejected claims are product claims. Moreover, applicants fail to show by factual evidence with 132 declaration that the instant method is critical and required to produce unexpected properties. The same response also applies to argument in page 8, third full paragraph of remarks filed October 14, 2008.

~~This combination of recited Ta content and dispersion, or oxygen content and dispersion in a~~
Applicants argue that “Nb sputtering target is not suggest by Ohhashi.”

First, the claimed Ta and O are inevitable impurities. There is no factual evidence that the claimed ranges of Ta and O impurities are critical and not inherent in commercial Nb. The claimed dispersion % includes zero when dispersion is uniform/constant that maximum value is same as minimum value. The same response also applies to argument in page 8, second full paragraph of remarks filed October 14, 2008.

~~Further, as disclosed in the present application, the diameter range of crystal grains can be controlled by heat-treating after plastic working. Thus, by properly controlling the process, giant dust in a formed Nb film can be decreased. This process also decreases the~~
Applicants argue that “dispersion of Ta and oxygen in a Nb sputtering target.” First,

claimed grain size is included in Ohhashi (col. 6, lines 1-20). Second, there is no factual

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evidence to show the recited method steps are the only steps to obtain claimed properties.

Applicants' argument in paragraph bridging pages 8-9 of remarks filed October 14, 2008 is noted. Examiner reiterates the responses in paragraphs immediately above.

~~can be controlled by heat-treating after plastic working. Ohhashi does not recognize this~~
Applicants argue that "feature of claims 1 and 27, and fails to anticipate those claims." "

Applicants' argument is immaterial because there is no 35 U.S.C. §102 rejection. Moreover, as is responded in paragraph above that there is no factual evidence to show the recited method steps are the only steps to obtain claimed properties.

~~Applicants agree that the claims are product claims. Ohhashi, however, fails to disclose structural limitations of claim 1, such as the recited content and dispersion of Ta and oxygen, which are structural limitations. The fact that Ohhashi further fails to disclose any~~
Applicants argue that " oxygen, which are structural limitations. The fact that Ohhashi further fails to disclose any: "

Examiner reiterates the second response above, in this "Response to Arguments" section. Moreover, the claimed dispersion does not exclude uniform dispersion which is convention requirement for uniform properties.

~~The Patent Office states on pages 5-6 of the Office Action "[t]he claimed dispersion % includes zero when dispersion is uniform/constant that maximum value is same as minimum value." Applicants would like to clarify that while a uniform distribution of impurities would suggest a zero dispersion %, as dispersion % is defined in the claims, a uniform dispersion % merely means that the dispersion % is constant, not zero. That fact that~~
Applicants argue that " a value of a parameter is constant does not suggest that the parameter is zero. " But,

as is shown by applicants' argument that it appears applicants are confused. It is clear

~~The Patent Office states on pages 5-6 of the Office Action "[t]he claimed dispersion % includes zero when dispersion is uniform/constant that maximum value is same as minimum value." Applicants would like to clarify that while a uniform distribution of~~
from the quotation by applicants that " minimum value." Applicants would like to clarify that while a uniform distribution of.. "
not "uniform dispersion %" means "dispersion % is zero" as interpreted by applicants.

Applicants' argument in page 11, first paragraph of instant remarks is noted. But, if dispersion is not measured by content/concentration of element, it is unclear how dispersion is being measured.

~~"uniform microstructure as taught by Ohtashi does not exclude uniform dispersion." While uniform microstructure may not exclude uniform dispersion, it also does not imply the dispersion levels as recited in claim 1. Moreover, a uniform dispersion, as dispersion is~~ Applicants argue that ~~"~~ But, instant claimed dispersion % does not exclude uniform dispersion which is inherently possessed by uniform microstructure for uniform properties.

~~dispersion levels as recited in claim 1. Moreover, a uniform dispersion, as dispersion is defined in the claims, merely means that the dispersion is constant, not that the dispersion is zero as suggested in the Office Action.~~ Applicants argue that ~~"~~

~~dispersion levels as recited in claim 1. Moreover, a uniform dispersion, as dispersion is defined in the claims, merely means that the dispersion is constant, not that the dispersion is zero as suggested in the Office Action.~~ But, applicants' argument that ~~"~~ is found inconsistent with the Office Action which does not suggest "dispersion is zero." Office Action discloses that "uniform dispersion" means "dispersion is constant" and "dispersion %" is zero because maximum and minimum values are same/constant.

Applicants' argument in page 12, first and second paragraphs and paragraph bridging pages 12-13 of instant remarks is noted. But, it is found inconsistent with applicants' declaration filed on April 12, 2004 that the Nb material contains inevitable Ta impurity in claimed range (see JP62-103335, Table 1, provided by applicants).

Applicants' argument in pages 13-15 of instant remarks is noted. But, applicants' alleged unexpected result has not been substantiated by factual evidence with 132 declaration. Moreover, the claimed Ta concentration is merely conventional concentration in crude niobium metal (JP62-103335, Table 1). Difference in degree of purity itself does not predicate patentability. In re King, 43 USPQ 400 and In re Merz,

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38 USPQ 143. Changing form, purity, or other characteristic of an old product does not render the novel form patentable where the difference in form, purity or characteristic was inherent in or rendered obvious by the prior art. In re Cofer, 354 F2d 664, 148 USPQ 268 (CCPA 1966). The dispersion % does not affected by the claimed Ta and/or O concentration. Furthermore, the instant claimed dispersion (%) of oxygen is up to 80% (claim 1) which hardly excludes any dispersion. Assuming arguendo that the Ta dispersion is non-uniform as targets 3 and 4 in instant Table A. The difference of resistivity of interconnection film is less than 3%. In view of data in instant specification that the claimed dispersions do not have significant affect on sputtering target properties. Thus, the claimed dispersion (%) has no criticality or unexpected result.

Ohhashi does not suggest the unexpected advantages resulting from the claimed

Applicants argue that *"amounts and dispersion"*.

But, the fact that applicants have recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985). Because applicants have different reason to reduce the Ta and O impurities that does not change the teaching of prior art to eliminate the Ta and O impurities. Moreover, applicants have not shown any unexpected advantages or unexpected result that would not be inherently possessed by the target of cited reference.

Conclusion

Applicant is reminded that when amendment and/or revision is required, applicant should therefore provide a concise explanation and support with page and line

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number in the specification for any amendments made to the disclosure. See 37 C.F.R. Part §41.37 (c)(1)(v).

Examiner Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to S. Ip whose telephone number is (571) 272-1241. The examiner can normally be reached on Monday to Thursday from 5:30 A.M. to 4:00 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Roy V. King, can be reached on (571)-272-1244.

The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Sikyin Ip/
Primary Examiner, Art Unit 1793

January 20, 2009